dirty gray brown color. Surrounding the abscess cavity is a dense area of acute inflammatory infiltration the size of an English walnut. Only one caseous area the size of a pea was found, the contents of which were transferred to slants of modified Dorset egg medium.

Microscopically, smear preparations show innumerable polymorphonuclear leukocytes; no bacteria. Stained sections from the wall of the abscess cavity show numerous recent tubercles with epithelioid and giant cells as well as central necrosis. Dr. Duval thinks it probable that the bacillus was of the bovine type, owing to the rapid course of the disease, the large number of polymorphonuclear leukocytes present in the pus, and the acute nature of the process histologically. The culture, however, was lost before titration observations could be carried out. The difficulty in maintaining the growth upon artificial media is an additional point in favor of a bovine infection.

After-treatment. Since operation, the patient has followed in a general way the line of treatment suggested in the body of this paper. Injections of T. R. (tuberculin), $\frac{1}{1500}$ milligram, have been administered every ten days. When last seen, in October, 1908, the patient was in excellent condition, and reported a gain in weight of eighteen pounds.

TUBERCULOUS PULMONARY CAVITIES IN INFANTS.

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The presentation of this paper on cavity formation in tuberculosis of the lungs in infants under two years of age has for its object, first, to record six cases; and second, to call attention to the frequency and location of pulmonary cavities at this age. In reviewing the literature the fact impresses itself that many writers on diseases of infants treat the subject in a very indefinite manner. Some do not refer to it, while others speak of it as if tuberculous cavities in infants followed the general course of events so frequently seen in the adult. This is somewhat surprising, because most of the authors who have written especially on this subject point out how difficult it is to make an antemortem diagnosis of a cavity in comparison to the condition in later life. We have had difficulty in selecting our cases from the literature, because many authors have failed to make the distinction between infancy and childhood. For our purpose, the subject may be divided into the following heads:

(1) The frequency of cavity formation in the lungs of infants; (2) the pathology of the condition; (3) the location of the cavities in the lungs; and (4) the report of six cases.

1. THE FREQUENCY OF CAVITY FORMATION IN THE LUNGS OF INFANTS. From the literature, we have been able to find special mention of cavity formation in quite a number of instances. These cases have been sifted from general discussions of the subject, rather than special reports of cases. We believe many cases have not been recorded because observers have not deemed it of sufficient importance to report them. Clinically, in the vast majority of cases cavity formation in the lungs of infants is entirely overlooked. We believe, therefore, that by calling attention to its frequency and localization, cavities should be more often recognized during life.

Leroux, in analyzing Parrot's cases, found cavity formation present in 57 cases out of 219 autopsies on patients under three years of age; that is 26 per cent. of the cases. He particularly mentions 5 of these cases which were under three months of age, but unfortunately no reference is made of the number under two years.

Warthin and Cowie quote Hugunin as reporting 2 cases, a seven-month premature infant and an infant seven weeks old; Berti, 1 case nine days old; Demme, 1 case eleven weeks old; Queyrat, 1 case three months old; and Flesch, 8 cases out of 500 autopsies on children in the early months of life. Demme reports 1 case, aged four weeks; F. Weber, 1 case, aged three months; Henock, 5 cases, aged four, seven, eight, ten, and eighteen months; Comby, 4 cases, aged four, six, eight, and nine months; and Deliarde, 1 case, aged six months, and speaks of the rareness of cavity at this age. Symes and Fisher, in reporting 500 deaths at various ages from tuberculosis, refer to two cases with cavities at five and eight months of age. Shennan reports 23 cases out of 355 cases (6.5 per cent.). Carmichael reports 2 cases, aged eight and fifteen months; Toulmin, 1 case, four months old; Donkin, 1 case, aged 1 year; Fry and Shaw, 1 case, twelve months old; Price-Jones, 3 infants, thirteen, sixteen, and twenty-two months old; J. Lewis Smith, 1 case, aged seventeen months; Green, 6 cases under two years; and Barthez and Sanne report 10 cases under two years.

Zuber says, "All authors agree that cavities are rarer in children than in adults." Baginski states: "Chronic tuberculosis with cavity formation in young children in characteristic form, as in the adult, is an infrequent disease." Other authors, as Rotch, Monti, Jacobi, Still, Osler, and Ashby, speak in general terms of the rarity of cavities in infants under two years compared with older children. The above mentioned cases, in all likelihood, do not represent the observations of these men as to the frequency of cavity formation, but simply some of the cases which they have had occasion to refer to in reports. On the other hand, the following observers have found cavitation in infancy of more frequent occurrence: Northrup, in a personal communication, says: "Tuberculous cavities are not rare in infants as young as a few weeks even. They follow the law which would seem to apply to adults. The lesion is common." Rilliet and Barthez report cavities in the proportion of one to three, in cases from one to two and one-half years. Holt says, "Areas large enough to deserve the name cavities were present in 35 of 72 autopsies upon tuberculous patients, two years and under." De Rothchild states that pulmonary cavities are observed in one-third of the cases from one to two and one-half years. Hervieux reports that one-fifth of the cases in the course of the first year of life have pulmonary cavities. J. Francis Condie even went so far as to say, "Tuberculous cavities are much more frequent in very young children than in adults." Warthin and Cowie quote Weber as making the statement that he had many times observed tuberculous cavities of the size of half a lobe in children under the age of three months.

From the above resume of the literature, it will be seen that cavity formation in infancy has been observed by some observers in a high percentage of cases, while by others it has been found but rarely. From the comparatively few cases which we have been able to collect from the literature, the earliest case occurred in an infant premature at the seventh month, while the majority were found beyond the third month, with increasing frequency toward the end of infancy.

In order to study the frequency of tuberculous cavities in infants at the Children's Hospital of Philadelphia, the records for the past sixteen and three-quarters years have been reviewed. We have found that during this time 4518 infants have been admitted to the wards of the Hospital. Of this number, 1140 infants have died. The number of autopsies performed was 371, of which 75 disclosed tuberculosis. Of the total number of deaths, 6.5 per cent. were tuberculous. However, these figures are only approximate, because only one-third of the children dead were autopsied. Again, when we compare the number of tuberculous autopsies with the total number of admissions during this period, it will be found that 1.6 per cent. were tuberculous.

It will be seen from these statistics of the autopsy records that with us tuberculosis in infants under two years of age is an infrequent disease. This can partly be explained by the fact that the great number of infants coming to the hospital have some form of advanced gastro-intestinal disorder. If the actual number of cases of gastro-intestinal disease be studied from our autopsy reports, it will be seen that 155 of the 371 autopsies, or 41.7 per cent., were grouped under this head. Therefore, if these cases of advanced gastro-intestinal disease be omitted from our comparison, it will be seen that of the remaining autopsies (216) there were 75 cases, or 34.5 per cent. tuberculous. This latter comparison really emphasizes the high mortality of gastro-intestinal disorders (41.7 per cent.) far more than it does that of tuberculosis (34.7 per cent.) at this age. We believe, from the clinical aspect at least, that our former percentage of 1.6 per cent. of fatal cases is nearer the truth as far as tuberculosis at this age is concerned.

Below we have tabulated the ages of the tuberculous autopsies on infants:

First Year.	Cases.	*Second Year.*	Cases.
1 month old	0	12 months old	7
2 months old	1	13 " "	3
3 " "	2	14 " "	6
4 " "	1	15 " "	4
5 " "	5	16 " "	3
6 " "	9	17 " "	3
7 " "	5	18 " "	6
8 " "	3	19 " "	4
9 " "	2	20 " "	1
10 " "	5	21 " "	1
11 " "	2	22 " "	0
		23 " "	2
	35		40

Number of tuberculous autopsies on infants under one year, 35.
Number of tuberculous autopsies on infants between one and two years, 40.
Total number of tuberculous autopsies on infants under two years, 75.

To study the frequency of cavity formation in the lungs of infants dead of tuberculosis, we have gone over the records of the Children's Hospital, and found that cavity formations were present in 12 of the 75 subjects dead of tuberculosis (16 per cent.).

As we stated above, we encountered difficulty in trying to estimate this frequency from the literature. In only a few reports were actual statements as to percentages obtainable: Holt reported cavity formation in the proportion of 1 to 2; Rilliet and Barthez, and De Rothchild, in the proportion of 1 to 3 (these cases were one to two and one-half years old); Hervieux, 1 to 5 (during the first year of life). In our cases 1 in 6 showed excavations, which is a considerably lower percentage than the observations of the above authors. Nevertheless, it will be seen, even in our cases, that cavity formation at the autopsy table is not uncommon.

If we consider the frequency of this process in older children, as compared to our findings in infants, it will be seen that in the former cavitation is not only more frequent, but follows the rule applying to adults. The usual explanation of this condition is conceded to be the greater resistance offered as the child grows older, allowing the process to become of a more chronic nature, and thus giving mixed infections greater opportunity to act.

Table Showing the Ages of the Cases Under Two Years of Age with Tuberculous Cavities at the Children's Hospital.

5 months old	1
6 " "	4
7 " "	1
11 " "	1
12 " "	1
15 " "	2
17 " "	1
19 " "	1
Total	12

II. THE PATHOLOGY OF THE CONDITION. In considering the pathology of tuberculosis at this age, a brief resume of the types of lesions may be of some value. It is not our purpose, however, to consider in detail these various lesions. Briefly the general pathology of tuberculosis at this age may be divided into three types: (*a*) Acute miliary tuberculosis; (*b*) chronic tuberculosis with fibrous changes; and (*c*) bronchocaseous pneumonic tuberculosis.

(*a*) *Acute miliary tuberculosis*, or acute disseminated miliary tuberculosis, of the lungs is considered rare by the majority of authors at this early age of life. When it does occur the miliary tubercles, either gray or yellowish gray in color, are found scattered throughout both lungs, and to a less extent in other organs of the body. These tubercles vary in size and number according to the degree of infection and the duration of the disease.

(*b*) *Chronic tuberculosis with fibrous changes* in the lungs can be very briefly considered here, because it scarcely enters into the discussion of our paper from the fact that many of the changes in the tissues are of a chronic nature. This type of tuberculosis at first is generally localized to a small area or areas, and the process is accompanied by the production of fibrous tissue. The process may consist of caseating areas containing small cavity formations, surrounded by more or less fibrous tissue. Distinct chronic tuberculosis of the lungs with cavity formation within the first two years of life, compared to the adult type of the disease, is rarely found at autopsy.

(*c*) *The caseous bronchopneumonic* type of tuberculosis is the most frequent form of the disease in the lungs at this age. It runs a more or less subacute course, and is almost always fatal. The advanced caseous lesions are usually confined to one lobe, or to one lung, with less marked lesions in the other lobes or lung. In a section of a lung, showing tuberculous lesions of this type, there are usually large caseous areas with intervening areas of bronchopneumonia, congested lung tissue, or normal lung tissue. The multiple lesions so frequently seen in these cases have their origin from some older process and are disseminated by way of the blood, lymphatics, or by insufflation. They increase in size from peripheral extension, and by the fusing of closely situated smaller areas. This method of extension is especially to be seen when the lesions are near the opposing surfaces of the lobes and it is not uncommon to see the greater part of one lobe with the adjacent parts of another lobe, involved in the caseous process. The interlobar pleura in such cases is obliterated by the tuberculous process, or stands out prominently as a fibrous band stretched across the caseous area. It is in these large caseous areas that cavity formation most frequently begins at this age. Cavities are usually the result of acute softening of the central parts of the caseous mass, and when this softened area communicates with a bronchus the fluid parts are thrown off, leaving a space or cavity. The softening of the caseous mass is generally the result of secondary infection, and is usually due to Streptococcus pyogenes, Staphylococcus pyogenes aureus and albus, Micrococcus tetragenous, or Diplococcus pneumoniæ. A pure tuberculous process, as a rule, does not tend to liquefy, it being a dryer, harder, and more cheesy process. This in itself would explain the infrequent cavity formation in our group of cases.

In examining the lungs of this type of tuberculosis one frequently finds small softened areas in these caseous lesions. These have been recorded by authors as instances of cavities; they in all likelihood would produce cavities in the course of time. We have not included such areas as cavities in our cases, because as antemortem excavations they had not existed.

The walls of the cavities are usually irregular in outline and somewhat darker in color than the surrounding lung tissue; especially is this true if the cavity has existed for any length of time. A distinct communication with a bronchus may be found on some part of the cavity wall; it may, however, be small and difficult to locate. The size of the cavity varies usually with the chronicity of the case and the size of the caseous lesion. From the microscopic examination of these cases it would seem that the process is rapid, as the walls of the cavity consist almost entirely of caseous material. Fibrous tissue formation in the walls of the cavities does not take place to any great degree in this group of cases, compared to the formation of this tissue in the adult.

The fact that in early infancy the tuberculous process in the lung is generally of an extensive bronchocaseous type, running an acute or subacute course, explains to a certain extent the absence of fibrous tissue in the lesions. It is a fact that the younger the individual, the more extensive the involvement and the more acute the course. This statement is the result of autopsy examinations, and does not take into consideration the numerous infections with the tubercle bacillus which undoubtedly occur in early life, and are held in abeyance or cured. As many of these latter cases are not diagnosticated, the occurrence of the disease can only be surmised from the widespread prevalence of tuberculosis. It is only in the susceptible cases at this age that the process becomes diffuse and of an acute or subacute course, ending fatally. It may also be noted here that in infants dying of tuberculosis, the lungs are involved in 100 per cent. of the cases.

III. THE LOCATION OF THE CAVITY. The literature on the subject of the localization of the cavity is not very extensive. The majority of authors state that cavity formation usually takes place in the lower lobes, and generally at the root or central part of the lung. Thus, D. Francis Condie says: "There is an important modification that should guide the practitioner when he seeks to determine the existence of a cavern in young children, viz., that under five years of age, the cavernous excavation is generally seated in the lower or middle lobes, and is almost always confined to one side of the chest." James M. Coley found cavities in infants much more frequently in the inferior lobes, and most often on the right side. Zuber also found the right lung most commonly affected, and generally only one lung. Again, both J. Walter Carr and S. Vere Pearson have observed that in infants the usual location of cavities is at the root or central portion of the lobe. Berti and Demme each report cases with a cavity in the lower lobe of the right lung. Fry and Shaw report a case with a cavity in the lower lobe of the left lung. Price-Jones reported an infant with cavities in the same location; but report another case with a cavity in the upper lobe of the left lung. Hugunin reported an infant with a cavity in the apex of the left lung. Henock reported four cases:

An infant, four months old, right upper lobe, two cavities.
An infant, seven months old, right upper lobe, two cavities.
An infant, four months old, right upper lobe, two cavities.
An infant, eighteen months old, both lungs, numerous small cavities.

J. Lewis Smith reported one case at seventeen months, with cavities in both upper lobes. P. Bennis Green reported 6 cases as follows:

An infant, two years old, summit of right lung.
An infant, two years old, middle lobe of right lung.
An infant, two years old, upper lobe of left lung.
Three infants, two years old, lower lobe of left lung.

On the other hand, Eustace Smith says, "The masses situated nearest the apex are commonly the earliest to liquefy, but not always."

Barthez and Sanne, in 77 cases of cavity formation in infants, found:

Cavities within the right lung, 47.	
Right upper lobe	34
Right middle lobe	9
Right lower lobe	16
Cavities within the left lung, 51.	
Left upper lobe	51
Left lower lobe	18

The location of the cavities in the cases at the Children's Hospital may be tabulated as follows:

Left lung, 6.	
Left lung, upper lobe	2
Left lung, anomalous middle lobe	1
Left lung, lower lobe	2
Left lung, location not specified	1
Right lung, 6.	
Right lung, upper lobe	2
Right lung middle lobe	1
Right lung, lower lobe	3

To summarize: Upper lobes, 4; middle lobes, 2; lower lobes, 5; location of cavity not specified, 1.

This small table shows the greater frequency of tuberculous cavities in the middle and lower lobes in infancy in our cases. If we consider the location of cavity formation in our own cases and of those collected from the literature, it will be seen that the lesion does not occur at the same location as it does in adults. In the majority of cases cavities in infants are deeply seated and usually at the root of the lung. In our cases cavities occurred more frequently in the lower and middle lobes than in the upper lobes.

IV. Report of Cases. Of the twelve autopsies performed on cases of tuberculous pulmonary cavities in infants at the Children's Hospital in the last sixteen and three-quarters years, 6 have come under our personal observation. It is these 6 cases we desire to report.

Case I.—Lillian R., aged six months, was admitted to the hospital on April 4, 1904. The family history was negative. The infant had been fed at different times on breast milk, condensed milk, and cow's milk. Although the patient had always been a delicate child, she had never had any serious illness. She was taken sick three weeks before admission to the hospital, with diarrhœa, weakness, and sweating at night. Four days before admission she developed a cough, coughing severely at times, and became extremely weak. The physical examination disclosed a bronchopneumonia in an emaciated, rachitic infant. The patient became weaker, the bowels continued loose, and the temperature irregular, until the child died, nine days after admission.

The *autopsy report*, abstracted, is as follows: Bronchocaseous pulmonary tuberculosis; tuberculous enteritis; tuberculosis of the liver and spleen. An emaciated colored infant with slight petechial eruption on abdomen. The left pleura shows a few tubercles on its parietal surface.

The left lung measures 11.5 x 6.5 x 3 cm., and weighs 70 grams. It is everywhere studded with grayish yellow tubercles, most of them small (millet seed), some few obtaining to larger size. Portions of the lower lobe are so thickly studded with tubercles as to sink in water. The lung is mottled gray and dark red. The air-content is especially diminished in the lower lobe. There is hypostatic congestion in the lower lobe and the lower part of the upper lobe. The surface section is granular, moist, and glistening, of a mottled grayish color. Crepitation is diminished, while the consistence is firm and tenacious, with a bloodstained fluid exuding. The right lung weighs 108 grams. The air content is practically absent in the lower lobe, and a portion of all three lobes sinks in water. The lower lobe is consolidated, but is less thickly studded than the left lung with miliary tubercles. The lower part of the middle lobe also shows pneumonia. The upper part of the middle lobe and the upper lobe show much more thickly scattered tubercles. There is a cavity in the lower portion of the lower lobe posteriorly, containing caseous detritus. The bronchial lymph glands are everywhere enlarged. There is tuberculosis of the cervical, mediastinal, and retroperitoneal glands. Miliary tubercles in liver and spleen. Also a fatty liver and chronic follicular colitis.

Case II.—John T., aged fifteen months, colored, was admitted to the hospital on April 5, 1904. The family history was entirely negative. Baby was fed since birth on skimmed milk. Until four days before admission to the hospital he was apparently well. During these four days he had profuse sweating cough, fever, and evident pain on touching the anterior chest wall. Examination showed a diffuse bronchopneumonia. Infant died three days after admission.

The *autopsy* findings, in brief, were as follows: Caseous bronchopneumonia; miliary tuberculosis of the lungs, pleura, omentum, liver, spleen, and the hepatic, mesenteric, bronchial, and retropharyneal glands.

Body of an emaciated, colored infant. The left lung measures 11.5 x 7.5 x 3.5 cm., and weighs 71 grams. The color is mottled gray; the air content is diminished in the lower lobe, but in the upper it is normal. In the upper part of the middle lobe there is a cavity 2.5 cm. in diameter, surrounded by tuberculous caseous infiltration. The walls of the cavity are irregular and bordered here and there with tuberculous caseous masses. The contents of the cavity are purulent. The pleura directly over the above area is adherent with recent fibrinous adhesions to the chest wall; on breaking these adhesions the cavity was ruptured. Scattered through the lower lobe, and less numerous in the upper lobe, are many yellow tubercles. The right pleura shows a few pearly tubercles on the parietal layer. The right lung measures 10.5 x 8. x 2.5 cm., and weighs 49 grams. This lung is not affected except for a number of yellow tubercles.

Case III.—Moses C., aged six months, colored, was admitted to the hospital January 8, 1905. The father and mother are living and well; they have had two children, the patient and one other child which is dead. The cause of death given was teething(?). The patient had been breast fed up to the time of admission. He has always been well until three months before coming to the hospital; during these three months the infant had a severe cough, but two days before admission cough became worse and great quantities of mucus were coughed up. The examination elicited the physical signs of a bronchopneumonia. The temperature was not hectic. In two days after admission the infant died.

The *autopsy* revealed: Caseous bronchopneumonia; general miliary tuberculosis; tuberculosis of the liver and spleen, and of the bronchial and mesenteric lymph glands.

The left lung weighs 145 grams. The entire lower lobe and the lower part of the upper lobe are consolidated. There is a large cavity 3 x 2 x 4 cm. in the upper third of the lower lobe posteriorly. It is superficial, and in one place a thickened pleura forms part of the wall. The bloodvessels and bronchi bridge across the cavity, and the walls are very irregular and dark in color. A small cavity, 0.5 x 0.5 x 0.5 cm., is also found on the lower surface of the lower lobe. There is an extensive obliterative diaphragmatic pleurisy at this location which brings the cavity close to the diaphragm. The whole lower lobe shows advanced caseous pneumonia, and also the greater part of the upper lobe, especially posteriorly. The air content is absent, except along the anterior border and at the apex. On both sides the bronchial glands are very much enlarged and caseous. Miliary tubercles in the liver, spleen, and intestines. The mesenteric glands are caseous.

Microscopic section of the lung close to the cavity wall shows diffuse cellular infiltration of tuberculopneumonic type. The type of cells present is lymphocytic, with a very few polymorphonuclear cells. There is congestion of the capillaries and giant-cell formation. The tissues in the immediate vicinity of the wall of the cavity show numerous large areas of typical caseation, but there is very little fibrous tissue formation. The large bronchial tubes in the neighborhood show marked bronchitis, the cellular exudate consisting of polymorphonuclear cells and lymphocytes. The walls of the bronchi show the infiltrating process.

CASE IV. Robert N., aged eleven months, colored, was admitted to the hospital November 28, 1905. The family history was negative; the mother and father living and well. There was only one other child, and it was well. There was no history of tuberculosis in the family. The baby's birth was normal, and up to the time of admission it had been fed exclusively on breast milk. It had always been well, with the exception of an attack of gastro-enteritis when six months old. For several months before coming to the hospital the infant had had a cough, which in the last two weeks had become much more severe. On admission the infant presented the physical signs of a bronchopneumonia. Two days later it became much worse, cough very severe, especially at night. It did not take its feedings well and the bowels became loose. It began to vomit, and on one occasion the vomited material was streaked with blood. The infant died twenty-two days after admission.

The *autopsy* report was as follows: Caseous bronchopneumonia; general tuberculosis; tuberculosis of the liver, spleen, mesenteric and bronchial glands; tuberculous enteritis and peritonitis; chronic fibrinous pleurisy.

The left lung weighs 62 grams. It is slightly congested, and shows a slight amount of œdema. This lung contains a few scattered gray miliary tubercles. The bronchial glands are slightly enlarged. The right lung weighs 205 grams. The whole lung is consolidated, it is firm in consistency and grayish yellow in color. The surface section is smooth, dry, and dull. There is a cavity at the upper part of the middle lobe, external to the mid-clavicular line. The cavity measures 2 x 1 x 3.5 cm. in size and extends upward into the upper lobe. The walls of the cavity are dark in color and covered with granulations. In the upper lobe there is an excess of fibrous tissue. Over the right lung there is a chronic adhesive pleurisy. There is tuberculosis of the intestines, peritoneum, spleen, liver, appendix, and mesenteric glands.

A microscopic examination of the section from the wall of the cavity shows fibrous tissue and a cellular exudate consisting of polymorphonuclear cells and small lymphocytes. The tissue in close proximity to the cavity wall consists of an overgrowth of fibrous tissue which extends into the alveolar walls. Embedded in this fibrous tissue there are collections of typical tubercles; they are for the most part small and show a small amount of caseation. Giant cells are very prominent. The surrounding lung tissue shows the capillaries congested. Widespread caseation of the caseopneumonic type is not present. The process is a chronic fibrocaseous tuberculosis, with the presence of many giant cells.

CASE V.—Lillian P., aged one year, colored, was admitted to the hospital May 27, 1907. The parents were living and well. There had been no other children. The patient's birth was normal, and until the time of her admission she had been breast fed. She had never had pertussis, measles, or any contagious disease. She had had fever for one month before coming to the hospital. Baby had been vomiting sour milk immediately after feeding several times a day. The bowels were constipated. For three days before admission she had a number of general convulsions lasting from five to ten minutes. Examination revealed harsh breathing all over the lungs, with many large moist rales. She had slight rigidity of the neck muscles and a positive Kernig's sign. By lumbar puncture 45 c.c. of slightly cloudy fluid was withdrawn, in which tubercle bacilli were found. Child died forty-eight hours following admission, after having had a number of convulsions.

The *necropsy* follows: Caseous bronchopneumonia; tuberculous enteritis; tuberculosis of liver and spleen; tuberculous meningitis. The left lung is 10 x 8 x 3.5 cm., and weighs 80 grams. The pleura is normal. The surface section of the lung shows numerous small gray translucent tubercles, without bronchopneumonia. The tubercles are isolated. There is slight hypostatic congestion in the dependent parts. The lung is crepitant and exudes bloody fluid on pressure. Bronchi and pulmonary vesels are normal. The bronchial glands are greatly enlarged. The right pleura is congested and thickened. There are firm adhesions from the right upper lobe to the anterior axillary line, and from the middle lobe to the fourth rib. There are adhesions posteriorly over the upper lobe. The right lung measures 13 x 9.5 x 3 cm., and weighs 95 grams. Generally, this lung is the same as the left, with the exception of the upper lobe. The upper lobe contains a cavity 1.5 x 1.5 x 2 cm., situated 1 cm. from the apex, and another cavity below this at the base of the lobe measuring 2.5 x 2 x 1 cm. Surrounding these cavities the lung tissue in this lobe is consolidated by a caseous pneumonia. On pressure mucopus exudes. The liver shows fatty change, and there are translucent gray tubercles distributed throughout. The spleen contains a few gray tubercles. The small and large intestines show numerous tuberculous ulcers especially in the lower part of the ileum. The mesenteric glands are greatly enlarged, and some are caseous.

CASE VI.—Braxton R., five moths old, colored, was admitted to the hospital February 6, 1907. His father, mother, and two sisters are living and well. Infant's birth was normal, and it had never been sick until six weeks before admission. During this time he had a severe cough. Mother states that a dark-colored discharge comes from the nose during coughing attacks. The physical examination revealed an emaciated colored infant, whose lungs showed numerous moist rales both anteriorly and posteriorly. A smear made from the throat, in order to obtain some expectoration, showed no tubercle bacilli. Heart and abdomen were negative. There was a small amount of blood in the bowel movements. Infant died eleven days after admission.

The *nercopsy* report follows: Caseous bronchopneumonic tuberculosis; general miliary tuberculosis; tuberculous pleurisy and peritonitis; tuberculosis of liver, spleen, kidneys, and intestines; fatty heart and kidneys.

The pleura on the left side is normal, but on the right side there are tuberculous adhesions. The left lung measures 9 x 5 x 3 cm., and weighs 45 grams. The air content is greatly decreased, and there are a number of large yellow tubercles scattered throughout the lung. The right lung measures 10 x 6 x 3.5 cm., and weighs 85 grams. This lung shows extensive pneumonia with many yellow tubercles, and tuberculous infiltration around the small bronchi. Crepitation is absent; the lung is firm in consistency, and the amount of blood is increased. At the right apex posteriorly the pulmonary tissue is broken down, leaving a tuberculous cavity, 2 x 1 cm. On the parietal peritoneum are seen a number of discrete yellow tubercles, 3 mm. in diameter, having the appearance of bovine tuberculosis. There are miliary tubercles in the liver, spleen, kidneys, and intestines.

The six cases of cavity formation all occurred in negro infants between the age of five and fifteen months. Our experience bears out the well-known fact that the colored race is especially susceptible to tuberculosis, and the cases autopsied usually showed widespread lesions of an advanced type. Miliary tubercles were present in the lungs especially, and to a less extent in other organs. These lesions were usually small, in all likelihood an evidence of terminal infection, and were secondary to the larger lesions, either of the lungs or lymphatic nodes. The bronchial glands were tuberculous in all these cases. The pleura in our cases showed widespread adhesions or distinct miliary tubercles. No data were obtainable, either in the family or personal histories of the cases, which would indicate the source of the infection. In only one case had there been any disease prior to the fatal illness, namely, one infant having had an attack of gastro-enteritis (Case IV). Three of our cases had been fed exclusively on the breast until admitted to the hospital. The cavity formation in the lungs was with one exception of short duration, and occurred in the larger caseous areas of the lungs, and was not surrounded by fibrous tissue so commonly found in older children. In one case only was the process of longer duration, showing the formation of fibrous tissue around the borders of the cavity.

In conclusion we may say cavity formation does not occur with the same frequency in infants as in older children. In our own autopsies 16 per cent. of the infants dead from tuberculosis showed cavity formation: a far lower percentage than is reported by other observers. The type of lesion observed by us is not of the variety which lasts long enough to produce cavity formation. The infants usually succumb to the widespread process before the larger lesions have time to soften and their contents to be thrown off. In our cases tuberculous cavities in infants occurred most often at the root of the lungs, in the middle and lower lobes.